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TSI NEWS LETTER

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Dr G K Sharma's Driving Pleasure With Hydrogen Engine

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During my recent visit of BMW Head Quarters in Munich, Germany, I had the privilege to be driven around in a BMW Hydrogen 7 car powered by Hydrogen combustion engine. This luxury vehicle is capable of running on hydrogen as well as petrol with the same engine output in either operating mode. As a matter of fact, we started our journey from the garage on petrol mode and were driving at a speed of around 140 km/h on highway and then the operation was switched over to hydrogen. There was no power loss or loss of acceleration while running on hydrogen.

BMW prefers the use of liquid hydrogen for the simple reason that for the same construction volume as for a conventional storage tank, the amount of energy contained in liquid hydrogen (at about -250°C) is 75% higher as compared with gaseous hydrogen, stored at 700 bar.

As the hydrogen, availability at filling stations is in early stages of development the bivalent system of engine operation adopted by BMW addresses the unlimited freedom of mobility. BMW 7 has a comfortable range of more than 700 km - 200km in hydrogen mode and 500 km in petrol mode.

The 12 cylinder engine of BMW Hydrogen 7 has an output of 260 bhp and achieves maximum torque of 390 Newton metres at 4300 rpm. Its top speed is limited to 230 km/h and can accelerate to 100 km/h in 9.5 sec. BMW Hydrogen 7 is a direct injection petrol engine but in hydrogen mode, it is port injection. Due to physical characteristics of hydrogen, petrol injection system are unsuitable. This necessitated the development of injection and metering valves suitable of operation in various system pressures as well as for injection durations.

It is not fair to state that all exhaust is pure water vapour as is generally believed because lubrication system is still conventional in Hydrogen based IC engines. Only a minuscule amount of lubricant burns in the cylinder alongwith hydrogen and thus it is very safe within EU4 standard.

Mr N M Dube reports on STLE/ASME INTERNATIONAL JOINT TRIBOLOGY CONFERENCE IJTC-2007, OCTOBER 22 - 24, SAN DIEGO, USA.



The international Joint Tribology Conference (IJTC)-2007 was organized by the Tribology Division of American Society of Mechanical Engineers (ASME) and Society of Tribology and Lubrication Engineers (STLE) on October 22 - 24, 2007 at San Diego. These were the days, you may recall, San Diego suffered severe wildfire. Though more than 50 thousand people were evacuated to safety and as many as 12 thousand were sheltered in Qualcomm stadium which was a short distance away from the conference venue, there was barely any noticeable impact on civic amenities!

There were over 300 technical presentations made in the following 14 technical tracks: Tribomaterials, Lubricants and Additives, Elastohydrodynamic Lubrication, Hydrodynamic Lubrication and Fluid Film Bearings, Rolling Element Bearings, Engine Tribology, Machine Components Tribology, Contact Mechanics, Magnetic Storage Tribology, Manufacturing/Metalworking Tribology, Nanotribology, Engineered Surfaces, Biotribology & Emerging Technologies

In addition, there were 30 student posters, panel discussions and an exhibition with 9 booths. It was attended by around 400 delegates from 36 countries. They also enjoyed a special symposium in honor of esteemed tribologist Dr. Ward O. Winer, of Georgia Tech who delivered an interesting address titled, "I Was in Tribology Before Tribology was Cool." Various awards for the year 2007 were conferred. Recipient of the Captain Alfred E. Hunt award was Dr. Scott Bair of the Georgia Institute of Technology in recognition of his paper: "A More Complete Description of the Shear Rheology of High-Temperature, High-Shear Journal Bearing Lubrication" published in January 2006, Tribology Transactions. The other notable honor, the 2007 International award went to Dr. Ted Harris, retired professor, Pennsylvania State University. Dr. Harris' work on rolling element bearing fatigue has led to a new theory that included the effect of multiple variable interactions in predicting fatigue damage. This method has been widely used by the industry, and will be adopted in ISO standard for rating of rolling element bearings. For the first time there was an online poster presentation contest with 17 contestants around the world. In addition to the technical program, the meeting provided a forum for networking and informal exchange of ideas among participants from academia, research labs, industry, and government agencies.

The 2008 International Joint Tribology Conference is scheduled on Oct. 20-22 at the Hyatt Regency Miami hotel in Miami, Florida (USA). Deadline for abstracts is March 14, 2008.

Local Chapter Activities

National Workshop On Rolling Element Bearings ORGANIZED BY CMERI DURGAPUR



Mr. G. S. Rattan, Chief Guest, NWREB-06 and Chief Executive Tata Bearing Delivering Guest Lecture



Cultural Programme

A two days workshop on Rolling Element Bearings during 24th and 25th July 2006 with specific theme: Future Directions in Research on Rolling Element Bearings in India was organized by Central Mechanical Engineering Research Institute, Durgapur. This workshop was sponsored by Department of Science & Technology (DST), New Delhi Council of Scientific and Industrial Research (CSIR), New Delhi and Co-sponsored by Tribology Society of India (TSI). The broad objective of this workshop was to provide an opportunity and platform for the scientists, manufacturers, maintenance engineers, academicians to interact and understand the complex & diverse problem of rolling Element Bearings in Indian's future perspective. Rolling Element bearings are very critical components of all machines and equipment as their malfunctioning costs heavily to the performance of the system. Understanding and evaluation of the life of rolling element bearing is, therefore, of great concern. This programme was a step taken in the direction of exploring the untouched domains of rolling element bearings technology and also to seek guidance for the future research to be carried out in this aspect by building a strong and unique partnership between the industry, academia and the research laboratories.

Dr. Gopal P. Sniha, Chairman NWREB-2006 & Director, CMERI welcomed the guests, participants and the staff members of CMERI. The workshop was inaugurated by Prof. D.V. Singh, Patron NWREB-2006 & Former Director, IIT-Roorkee who delivered the inaugural lecture on importance of bearings to the august gathering. Sh. G.S. Rattan, Executive-In-Charge, TATA Bearings, a division of TATA Steel was the Chief Guest on the occasion and emphasized the importance of Industry, R & D Laboratory and Academic institution's interaction and collaboration for quality augmentation of bearings by indigenous bearing manufactures. Inaugural session was concluded by the vote of thanks by Organizing Secretary, Sh. N. C. Murmu, Scientist, CMERI.

Delhi Chapter

Delhi Chapter Organises ONE DAY WORKSHOP ON POWER PLANT LUBRICATION



Mr. AK Mehta, Dr GK Sharma and Dr RK Malhotra inaugurate the Workshop by lighting the Ceremonial Lamp



Mr. TL Nanda and Dr KP Naithani speak during Concluding Session

A workshop on the theme of power plant lubrication was held at Indian Habitat Center, New Delhi on May 12, 2007. Tribology Society of India-Delhi Chapter and CIMAC INDIA jointly organized the workshop. The lead sponsor of this workshop is Indian Oil Corporation Limited (Marketing Division). Lubrizol India Pvt. Limited also supported this workshop.

Recognizing the growing importance of power generation segment and need for good maintenance practices for power plant sector, organizers of the workshop have designed the technical programme of this workshop in such a way that every aspect of power plant lubrication-be it turbine based, diesel generating sets or transformers- ranging from equipment design trends to new developments in lubrication and lubricating oils had been included.

The workshop was inaugurated by Dr.R.K.Malhotra, Executive Director, IOC R&D and President, CIMAC India who underlined the need for technological innovations in this critical inter-disciplinary area of science and technology-Power plant maintenance and lubrication. Dr.G.K.Sharma, Technical Director, NATRiP, New Delhi and President, Tribology Society of India also addressed the gathering outlining the future activities of Tribology society of India. All the technical presentations of the workshop were compiled in the form of a CDROM and the same was formally released by Dr.K.P.Naithani, General Manager, IOC R&D and EC member, TSI-DC chapter.

Session on Turbine lubrication was addressed by Dr. .KK Chaturvedi, of BHEL R&D, Hyderabad and Mr.R.T.Mookken, DGM, IOC R&D. They covered about Turbine design trends and recent developments in the area of turbine lubricants respectively. This session was chaired by Sh.S.K.Rajya, AGM, NTPC, New Delhi. Session on DG set lubrication, which was chaired by Sh.A.K.Mehta, former GM, IOC R&D, was addressed by Sh.Prashant Makkar of Wartsila India and Dr.SSV Ramakumar, Chief Research Manager, IOC R&D who talked about DG lubrication and IOC's new range of DG set lubricants-Servo Marine K-Sereis- respectively. Session on Transformer lubrication, chaired by Dr.K.P.Naithani, GM, IOC R&D, was addressed by Mr.Sridhar of CPRI, Bangalore. Dr.Anoop Kumar of IOC R&D who talked about power plant greases. Sh.T.L.Nanda, DGM(TS), IOC, Mumbai enlightened the audience about condition monitoring techniques and their significance of various power plant lubricants.

The workshop was attended by more than 80 participants from various customer organizations engaged in power plant operation, NTPC units of Northern India and some of engineers of IOC Northern region. All the participants expressed their satisfaction about the technical proceedings of a focused theme in the concluding session which was chaired by Mr.T.L.Nanda and Dr.K.P.Naithani.

Mumbai Chapter

Mumbai Chapter organises a THEME MEETING ON NUCLEAR TRIBOLOGY



A theme meeting on " NUCLEAR TRIBOLOGY- (Understanding Friction, Wear and Lubrication)" at Multipurpose hall, Training school hostel, Anushaktinagar, Mumbai-400094 was organized by Refueling Technology Division, Bhabha Atomic Research Center in technical association with Tribology Society of India Mumbai Chapter and was sponsored by Board of Research in Nuclear Sciences, DAE.

It was inaugurated by Shri R.K.Sinha, Director Reactor Design & Development Group & Director, Design, Manufacturing & Automation Group, Bhabha Atomic Research Centre and inaugural Talk on " Tribology, its significance and Multi fold Applications" was delivered by Dr. Har Prasad, Consultant, Centre for Tribology incorporated & Ex. Sr. Deputy General Manager (Tribology), BHEL, Hyderabad which was concluded with a Vote of thanks by Shri. N.L.Soni, Head Fluid Power Tribology Section, Refueling technology Division, Bhabha Atomic Research Centre and Convener Theme Meeting.

There were three session, the first was presided by DR. K. RAVI, Chief Manager (R&D) , BPCL R&D , MUMBAI and covered a wide range of tribological subjects like polymer composites, water lubricated contacts, in sodium Tribology in PFBR, design challenges in precision mechanism in Indian PHWR type nuclear reactors and high temperature wear and friction monitor. In start of this session, Dr. Barun Chakraborti, L & T gave brief introduction about the Tribological Society of India.

The second session was presided by Prof. Dwivedi, IIT BOMBAY and covered a good mix of tribological subjects like Metallurgical Coatings, High flash point fluids for Nuclear Power Plant, High Temperature synthetic greases and Silicon Carbide Seals.

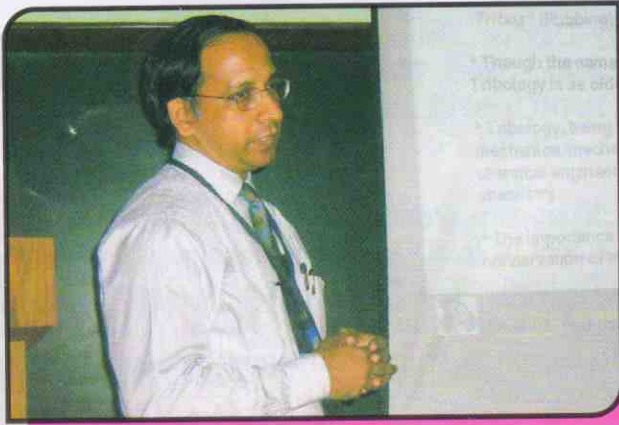
The second session was presided by Dr. A. K. Kohali, Cmd, Board Of Radiations And Isotopes Technology (BRIT), Mumbai and was brief presentation from various authors of Technical papers, which covered various tribological subjects from experimental to theoretical.

A good response was received though it was first of its kind. Total number of presentation made from various industries and research institutes are 18.

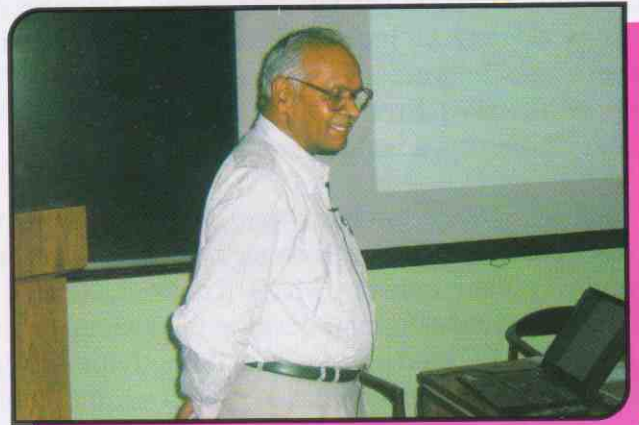
We have received the following form of technical presentation and papers:

□ No. of technical papers from BARC and DAE units	=	5
□ No. of technical papers from Industries and Research institutes	=	6
□ No. of participants BARC	=	90
□ No. of participants DAE units	=	25
□ No. of participants from Industries and Research institutes	=	60

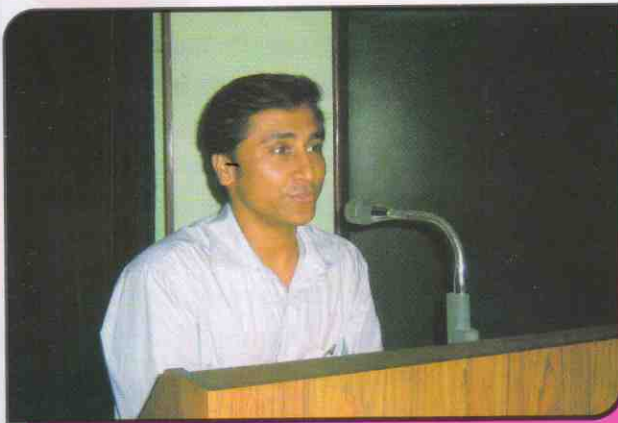
TRIBOLOGY DAY CELEBRATIONS



Dr. Barun Chakrabarti speaking on TSI activities



Prof. M. C. Dwivedi (ex-IIT Bombay) talking on "Tribofluids : Future Challenges"



Prof. Harish Hirani (I.I.T. Bombay) talking about the Indian Journal of Tribology



Dr. T. Singh (BPCL R&D) speaking about TSI Mumbai Chapter



Mr. Mukesh Gupta (Castrol India Limited) talking on TSI Initiatives



A section of the gathering

R&D - E&C Division (PRDH) organized "Tribology Day" celebration on 19th June 2007, in collaboration with Tribology Society of India (TSI) Mumbai Chapter. Tribology Day is celebrated on 19th June every year to commemorate the formation of Tribology Society of India on 19th June 1989. The program was attended by over twenty participants from organizations such as IIT-Bombay, BARC, BPCL, HPCL, Castrol, Hindalco, ICT Mumbai University, among others.

The "Tribology Day" program was coordinated by Dr. Barun Chakrabarti, Principal Technologist, R&D E&C Division and current Joint Secretary of TSI, with active involvement of R&D Rotating Machinery Group. The program was inaugurated by Mr. S. Krishnan, General Manager (Technology), E&C Division who highlighted the need for concerted efforts to develop the awareness and practice of Tribology in industry. Mr. S. V. Herwadkar, Head R&D, E&C Division outlined the activities of R&D since its inception, with specific reference to Tribology-related contributions in the areas of gears, bearings, lubrication and materials.

Prof. M. C. Dwivedi, EX-IIT Bombay, delivered an invited talk on "Tribo-fluids : Future Challenges". This was followed by technical discussion among the participants, covering present activities and future initiatives of TSI aimed at promoting the awareness and practice of Tribology in educational institutions, research laboratories and various industry sectors in India.

In the concluding session, the participants lauded L&T's initiative in organizing this program and promoting the cause of Tribology in collaboration with TSI Mumbai Chapter.

Ranchi Chapter

TRIBOLOGY DAY CELEBRATIONS

TSI Ranchi Chapter celebrated Tribology Day on 19th Jun'07 at Hotel Chinar, Ranchi. It was participated by over 40 tribologists from industries and institutions in and around Ranchi. The ceremony was inaugurated by Prof. Sudeep Ghosh, Executive Director, Indian Institute of Coal Management, Ranchi. Mr GMD Murty, General Manager, SAIL R&D Centre, addressed the gathering as Guest of Honour. Mr BN Dixit, Former Director of Coal India Ltd., and Mr Dilip Kumar, Chief (Tata Steel, Kotre-Basantpur Project), were among the dignitaries who attended the programme.

Two technical presentations were organised in the programme which were liked and appreciated by all present. The first presentation was made as keynote address by Dr Damodar Rai, DGM (RDCIS, SAIL), on "Characterisation of wear behaviour of different microstructures in Ni-Cr-Mo-V Steel". The second presentation was made by Mr Kamal Mukherjee, S.E. (CCL), on "Application of Tribology in Transport and Heavy Earth Moving Machinery". Abstracts of these presentations were compiled and sent to the participants.

At the end of the programme, vote of thanks was presented by Mr A Hafeez, S.E. (IICM). A dinner was hosted by TSI for all the participants.

Mr Pathak, Chairman of the Chapter put it on record that the ceremony was successfully organised with the active support of two of our members Mr Kamal Mukherjee and Mr A Hafeez. He expressed his sincere thanks to both of them. He also took this opportunity to thank TSI Secretariat for encouraging us to organise the Tribology Day as well as for extending the financial assistance. The Chapter has started its activities after a long gap and credit goes to TSI Secretariat.

Bhopal Chapter

The Annual general Body of the Bhopal chapter of the tribology Society of India along with Tribology day celebrations was held at AMRPI, Bhopal [formerly Regional Research Laboratory, Bhopal] on June 20, 2007 at 4PM in the conference hall of AMRPI, Bhopal.

"Tribology day" was organised on the occasion, in which Dr. Rupa Dasgupta Secretary of the local chapter dealt with the importance and significance of the Day and invited Dr. S. Das, Scientist AMPRI and Member TSI to present a technical talk on "abrasive Wear of Al-alloy composites".

This was followed by the AGM of the local Body in which the secretary presented the yearly report of activities and future plans and also mentioned about the circulars received from Head Quarters and their future plans and sought cooperation from all members in increasing the local chapter activities and participate in the TSI activities in general. It was decided to hold quarterly lectures from eminent personalities and also bi-weekly lectures from local researchers and academicians jointly with other professional bodies functioning at Bhopal namely MRSI and IIM Bhopal chapters.

The present executive committee was elected in 2005 and this year new office bearers were unanimously elected. They are as follows:

Dr. A.K. Jha President
Dr. Mohini Saxena Vice president
Dr. B.K. Prasad Secretary
Mr. T.S.V.C. Rao Treasurer.

The new office bearers have taken over the charge and the bank from where the TSI Bhopal chapter activities are operated have been intimated to note the new signatories.

Proceedings ICIT 06

A limited number of proceedings of the 5th International conference on Industrial Tribology is available on sale. Those interested to buy these may contact Prof Satish V Kailas at IISc Bangalore. Each CD with Abstract in hard copy will cost Rs 500/-

Indian Journal of Tribology

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Tribology Society of India

announce

6th International Conference on Industrial Tribology 2008 (ICIT-2008)
November 20th to 22nd 2008
at India Habitat Centre
New Delhi, India

Chairman Organising Committee
Dr RK Malhotra, ED (R&D)

Organising Secretary (Technical)
Dr KP Naithani, GM (LT)

Organising Secretary (Organisational)
V Martin, DyGM (Tribology & NS)

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